

AMENDMENTS TO THE CLAIMS

The following listing of claims, in which text to be added is underlined and text to be deleted is surrounded by brackets, will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (cancelled)

2. (withdrawn) The radially expandable artificial valve prosthesis of claim 1, wherein the support structure is expandable to a particular diameter upon deployment, and wherein the valve prosthesis is configured such that the artificial sinus comprises a portion of the bodily passage that is substantially unsupported by the support structure such that the artificial sinus is adapted to assume a diameter that is larger than the deployment diameter of the adjacent support structure.

3. (withdrawn) The radially expandable artificial valve prosthesis of claim 2, wherein the sinus has a proximal and distal end such that support structure include a first portion disposed adjacent to the proximal end of the sinus and an interconnecting second portion adjacent to the distal end of the sinus.

4. (withdrawn) The radially expandable artificial valve prosthesis of claim 3, wherein the first and second portions of the support structure are interconnected by a pair of oppositely placed struts.

5. (withdrawn) The radially expandable artificial valve prosthesis of claim 4, wherein in the valve structure is connected at least in part to the oppositely placed struts.

6. (withdrawn) The radially expandable artificial valve prosthesis of claim 1, wherein the support structure comprises a first end and a second end, wherein the valve structure is located about the first end and the first end of support structure has an enlarged diameter that is configured to create the artificial sinus about the valve structure.
7. (withdrawn) The radially expandable artificial valve prosthesis of claim 1, wherein the expandable support structure includes an intermediate portion, a proximal portion, and a distal portion; wherein the intermediate portion has a diameter that is larger than the diameter of the distal and proximal portions such that an artificial sinus is created thereabout.
8. (withdrawn) The radially expandable artificial valve prosthesis of claim 7, wherein the intermediate, proximal, and distal portion comprise interconnected segments.
9. (withdrawn) The radially expandable artificial valve prosthesis of claim 8, wherein the intermediate portion comprises a first and a second radially expandable anchoring portion that each include a first end, a second end and at least one constraining mechanism configured with the first end and the second end of the first and second radially expandable anchoring portion being of different diameters such that the first and second radially expandable anchoring portions collectively form the artificial sinus.
10. (withdrawn) The radially expandable artificial valve prosthesis of claim 7, wherein the intermediate portion comprises the artificial sinus that forms a expanded portion extending outward from adjacent portions of the collapsible

support structure.

11. (withdrawn) The radially expandable artificial valve prosthesis of claim 10, wherein the support structure comprises a superelastic material.

12. (withdrawn) The radially expandable artificial valve prosthesis of claim 11, wherein the superelastic material comprises nitinol.

13. (cancelled)

14. (withdrawn) A radially expandable artificial valve prosthesis for deployment in a bodily passage, comprising: a valve structure comprising leaflets adapted to restrict fluid flow therethrough; a support structure attached to the valve structure; a covering of material extending over the support structure; wherein the support structure includes a first section having a first diameter and a second section attached below the first section having a second diameter substantially smaller than the first diameter such that retrograde flow increases in velocity as it passes through the second section; and wherein the valve structure is located within the second section such that pockets are formed between the valves structure and walls of the bodily passage, the pockets configured to be continually flushed by retrograde flow from above.

15. (withdrawn) A radially expandable artificial valve prosthesis for deployment in a bodily passage, comprising: a valve structure, including a plurality of leaflets adapted to restrict fluid flow therethrough; a support structure comprising a series of proximal bends comprising commissural points for the attachment of the plurality of leaflets and adjacent distal bends located therebetween, wherein the proximal bends generally define a first angle and the distal bends generally define

a second, larger angle such that the leaflets maintain an orientation that is substantially parallel with the bodily passage as they extend proximally from the proximal bends before curving outward to engage at least one of the support structure and the vessel wall; and wherein the orientation of the leaflets is configured such that a pocket is created adjacent the proximal surfaces thereof which is of sufficient size and shape such that fluid flowing in the retrograde direction is capable of achieving flow patterns that reduce stagnation of fluid therein.

16. (cancelled)

17. (cancelled)

18. (withdrawn) The radially expandable artificial valve prosthesis of claim 16, wherein the valve includes a pair of commissural points spanning an orifice created between the leaflets, and wherein the support structure includes a first and a second longitudinal attachment strut extending distally from each commissural point, the first and second longitudinal attachment struts defining a first angle therebetween that is less than 30.degree..

19. (withdrawn) The radially expandable artificial valve prosthesis of claim 16, wherein the first angle is less than 20.degree..

20. (withdrawn) The radially expandable artificial valve prosthesis of claim 16, wherein the first angle is less than 10.degree..

21. (cancelled)

22. (currently amended) A radially expandable artificial valve prosthesis for implantation in a vessel having a vessel wall comprising:

a support structure having a longitudinal axis, a first end that includes a first and a second commissure, and a second end located distal thereto, the first and second [commisures] commissures disposed substantially opposite each other with respect to the longitudinal axis, the support structure defining first and second attachment pathways, the first attachment pathway including a first proximal portion extending from the first commissure, a second proximal portion extending from the second commissure, and a first distal portion angling obliquely from the first and second proximal portions and defining a first distal commissure at the second end of the support structure, the second attachment pathway including a third proximal portion extending from the first commissure, a fourth proximal portion extending from the second commissure, and a second distal portion angling obliquely from the third and fourth proximal portions and defining a second distal commissure at the second end of the support structure, the first, second, third, and fourth proximal portions extending along a substantial portion of the length of the prosthesis and having a substantially parallel orientation with respect to the longitudinal axis of the support structure, the first and second distal commissures disposed substantially opposite each other with respect to the longitudinal axis;

a plurality of leaflets, each leaflet of the plurality of leaflets having an outer edge that includes a first lateral edge extending distally from the first commissure and a second lateral edge extending distally from the second commissure, the first and second lateral edges generally converging about the second end of the support structure such that the plurality of leaflets is configured to collectively form a seal with said vessel wall and restrict fluid flow through said vessel; and

wherein the first and second lateral edges of a first leaflet of the plurality of leaflets are each attached to the support structure along [an] the first attachment

pathway [that includes a first, proximal portion comprising a substantial portion of the length of the prosthesis and having a substantially parallel orientation with respect to the longitudinal axis of the support structure, and a second, distal portion angling obliquely from the first, proximal portion] and the first and second lateral edges of a second leaflet of the plurality of leaflets are each attached to the support structure along the second attachment pathway such that each leaflet of the plurality of leaflets has a coaptate area and a basal portion, the coaptate area and basal portion configured to cooperate with said vessel wall to define a valve pocket;

wherein the coaptate areas of the plurality of leaflets are configured to coapt with each other while said valve prosthesis is in a resting state and wherein each coaptate area of each leaflet of the plurality of leaflets has a length that is between 10% and 80% of the length of said valve prosthesis.

23. (cancelled)

24. (cancelled)

25. (cancelled)

26. (cancelled)

27. (cancelled)

28. (cancelled)

29. (cancelled)

30. (new) The radially expandable artificial valve prosthesis of claim 22, wherein each coaptable area of each leaflet of the plurality of leaflets has a length that is between 30% and 60% of the length of said valve prosthesis.

31. (new) The radially expandable artificial valve prosthesis of claim 22, wherein each coaptable area of each leaflet of the plurality of leaflets has a length that is between 35% and 55% of the length of said valve prosthesis.

32. (new) The radially expandable artificial valve prosthesis of claim 22, wherein each coaptable area of each leaflet of the plurality of leaflets has a length that is greater than 50% of the length of said valve prosthesis.